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EUROPEAN PATENT APPLICATION

(21) Application number: 82102408.0

(51) Int. Cl.³: A 61 K 7/035

(22) Date of filing: 23.03.82

A 61 K 7/32, A 61 K 7/48

(30) Priority: 23.03.81 US 246663

(43) Date of publication of application:
06.10.82 Bulletin 82/40

(84) Designated Contracting States:
CH DE FR GB IT LI

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(54) A solid entrapped emollient-moisturizer composition and the use thereof.

(57) This invention relates to solid, entrapped emollient-moisturizer compositions comprising a crosslinked polymer matrix and an emollient-moisturizer. The invention provides for conversion of solid and/or liquid emollients or moisturizers into solid, free-flowing forms by entrapment of the functional materials in a hydrophobic polymer lattice.

EP 0 061 701 A2

A solid entrapped emollient-moisturizer composition and the use thereof

This invention relates to a solid entrapped emollient-moisturizer composition.

- The art is replete with attempts to render functional materials amenable to release on demand through encapsulation. Encapsulation confines materials in discrete units as the result of coating particles of the material with an encapsulant. The coating or wall material used in encapsulation includes natural or synthetic polymers which permit release of the functional material by fracture, degradation or diffusion. This invention provides a unique combination of polymeric encapsulants and entrapped materials which result in compositions useful for incorporating a variety of materials, particularly emollients and moisturizers, into a variety of products such as cosmetics and health care products at levels which heretofore have been impossible to achieve.
- 15 The object of the invention is solved by a solid, entrapped emollient-moisturizer composition comprising from about 5 to about 95 weight percent of a crosslinked polymer matrix and from about 5 to about 95 weight percent of an emollient-moisturizer selected from the group consisting of a straight, branched or cyclic hydroxyl alcohol containing 1 to 30 carbon atoms, a straight, branched or cyclic carboxylic acid containing 1 to 30 carbon atoms, an ester containing a C_1 to C_{30} carboxylic acid esterified with a C_1 to C_{30} hydroxyl alcohol, a hydroxyl alcohol ether containing 1 to 30 carbon atoms, a carboxylic acid ether containing 1 to 30 carbon atoms, an alkane of the formula $H-(CH_2)_n-H$ wherein n is 5 to 30, lanolin and its derivatives and a siloxane.

It has now been discovered that a wide variety of materials commonly referred to as emollients or moisturizers which are either liquids or solids can be converted to free-flowing powders or beads by entrapment of the materials in a hydrophobic polymeric lattice. The
5 polymeric lattice functions to hold and protect the entrapped material, probably through sorption or swelling, and is capable of providing availability of the entrapped material by a variety of mechanisms including pressure, diffusion and extraction.

Significantly, when the products of this invention are incorporated in
10 cosmetic and toiletry products the polymeric lattice itself contributes to the beneficial effects to be imparted by application of the entrapped emollient-moisturizer material.

While this invention relates primarily to entrapment of emollient-moisturizers within the polymeric lattice, those skilled in
15 the art will recognize that a wide variety of functional materials can be entrapped within the polymeric lattice. For example, the invention contemplates that a wide variety of water insoluble organic liquids and solids may be incorporated within the lattice matrix. In fact, any functional material which will not react with the polymer system
20 comprising the polymeric lattice matrix can be entrapped within the polymeric lattice.

The application will discuss the invention as it relates specifically to emollient-moisturizer entrapped products. The terms

"emollient" and "moisturizer" include materials having properties defined for those terms in the text and articles:

M.G. de Navarre, The Chemistry and Manufacture of Cosmetics, Vol. 3, 2nd Ed. 1975, Chapter 9.

- 5 "Moisturization; A Systematic Approach" - L.J. Murphy
Cosmetics and Toiletries, Vol. 93 (March, 1978) p. 31

"Mineral Oil and Petrolatum; Reliable Moisturizers" by F. Tranner and G. Berube - Cosmetics and Toiletries, Vol. 93 (March, 1978) p. 81

- 10 The solid, entrapped emollient-moisturizer compositions of this invention are prepared by combining a functional crosslinking monomer, a monofunctional monomer and the functional material to be entrapped under such conditions as to initiate polymerization. As used herein, the term "functional crosslinking monomer" is meant to include di or
15 polyfunctional monomers having two or more polymerizable double bonds, while the term "monofunctional monomer" is meant to include a polymerizable monomer having one double bond. Functional crosslinking monomers useful in the invention may be a polyunsaturated monomer selected from the group consisting of a mono- or di- ester of an
20 alcohol and an α - β unsaturated carboxylic acid, polyunsaturated polyvinyl ether of a polyhydroxy alcohol; mono- or poly unsaturated amides and cycloaliphatic esters of α - β unsaturated carboxylic acids. Examples of such functional crosslinking monomers include polyethylene glycols having a molecular weight up to about 5000 including methylene
25 glycol dimethacrylate, diethylene glycol dimethacrylate, triethylene glycol dimethacrylate, tetraethylene glycol dimethacrylate and trimethylol propane ethoxylated triacrylate, available under the trademark CHEMLINK® 176, ditrimethylol propane dimethacrylate; propylene, dipropylene and higher propylene glycols having a
30 molecular weight up to about 5000 including polyethylene glycol dimethacrylate, 1,3 butylene glycol dimethacrylate, 1,4 butanediol dimethacrylate, 1,6 hexanediol dimethacrylate, neopentyl glycol dimethacrylate, pentaerythritol dimethacrylate, dipentaerythritol dimethacrylate, bisphenol A dimethacrylate, divinyl (trivinyl)
35 benzene, divinyl trivinyl toluene, triallyl maleate, triallyl phosphate, diallyl maleate, diallyl itaconate, and allyl methacrylate.

The monofunctional monomer of the novel polymeric system of this invention includes hydrophobic and hydrophilic monounsaturated monomers. The monomers include alkyl methacrylates and acrylates having straight or branched chain alkyl groups with 1 to 30 carbon atoms, preferably 5 to 18 carbon atoms. Preferred monofunctional monomers include lauryl methacrylate, 2-ethylhexyl methacrylate, isodecylmethacrylate, stearyl methacrylate, hydroxy ethyl methacrylate, hydroxy propyl methacrylate, diacetone acrylamide, phenoxy ethyl methacrylate, tetrahydrofurfuryl methacrylate and methoxy ethyl methacrylate.

The functional materials to be entrapped within the novel polymeric matrix of this invention are selected from materials commonly referred to as emollients and moisturizers, materials which are normally either liquids or solids. Functional materials such as perfumes, fragrances and flavors also may be combined with emollient-moisturizers and entrapped within the novel polymeric matrix of this invention. Examples of emollients and moisturizers which may be entrapped within the polymeric matrix of this invention include straight, branched or cyclic hydroxy compounds such as alcohols containing 1 to 30 carbon atoms; straight, branched, or cyclic carboxylic acids containing 1 to 30 carbon atoms; acid esters containing C_1 to C_{30} carboxylic acids esterified with C_1 to C_{30} alcohols; alcohol ether containing 1 to 30 carbon atoms; carboxylic acid ethers containing 1 to 30 carbon atoms; alkanes of the formula $H-(CH_2)_n-H$, wherein n is 5 to 30; and siloxanes. Examples of such functional materials include 2-ethylhexyl oxystearate available commercially as WICKENOL[®] 171; arachidyl propionate available commercially as WAXENOL[®] 801; 2-ethylhexyl adipate available commercially as WICKENOL[®] 158; isopropyl myristate available commercially as WICKENOL[®] 101; ethanol; stearyl alcohol; propylene glycol; propionic acid; stearic acid; polyoxypropylene cetyl alcohol, available commercially as WICKENOL[®] 707; polyoxypropylene lanolin alcohol available commercially as WICKENOL[®] 727; Carbowax[®] 300; petroleum jelly; mineral oil; aliphatic hydrocarbons such as mineral spirits; lanolin and lanolin derivatives such as acetylated lanolin and isopropyl lanolate; hexamethyl disiloxane, available commercially as DOW[®] Q2-1096; cyclic polydimethyl siloxane, available commercially as DOW[®] 344 and 345; and linear polydimethyl siloxane, available

commercially as DOW[®] 200; poly phenyl methyl siloxane, available commercially as DOW[®] 556; and poly dimethyl/trimethyl siloxane. Other phenyl, ethyl and vinyl substituted polysilanes may also be included in the products of this invention.

5 The crosslinking monomer, monofunctional monomer and functional material are combined in a ratio such that the novel entrapped composition of this invention comprises from about 5 to about 95 weight percent of a crosslinked polymer matrix and from about 95 to about 5 weight percent of the functional material. The ratio of
10 crosslinking monomer to monofunctional monomer in the crosslinked polymer matrix can vary within the range of 99:1 to 1:99. While not restricting the invention to any precise composition, in a typical product of this invention, the crosslinking monomer, monofunctional monomer and functional material are combined in a ratio such that the
15 novel crosslinked polymer matrix comprises from about 60 to about 80 weight percent of the functional monomer.

The crosslinked polymer matrix containing the entrapped functional material results from in situ polymerization of the monomer mixture containing the functional material desired to be entrapped.

20 Generally, this results from mixing the crosslinking monomer and monofunctional monomer, combining the functional material therewith to form a uniform mixture, and inducing polymerization. Polymerization may be induced by conventional initiators such as peroxides and the like, or by irradiation or redox systems. Polymerization usually
25 occurs at temperatures between about 0° to 120°C., preferably about 80°C. The time and temperature of polymerization may be varied in accordance with nature of the functional material, its concentration, and the attributes of the desired entrapped system.

The physical properties of the entrapped functional materials may
30 be influenced by several factors such as the precise combination of crosslinking monomer and monofunctional monomer selected, the ratio in which these two components are combined with one another and with the functional material. Accordingly, the entrapped materials of this invention which exist in the form of discrete, free-flowing powders or
35 beads may be hard and have the ability to withstand rather substantial shearing or the powders or beads may be soft, in which form they liquify with minimal pressure. In general, the greater the ratio of crosslinked polymer matrix to functional material, the harder the

entrapped material. The entrapped functional material ranges in particle size from about 0.001 millimeters to about 3 millimeters.

A simple test has been developed to enable prediction with reasonable accuracy whether or not a particular combination of crosslinking monomer, monofunctional monomer and functional material will polymerize to form the entrapped functional material of this invention. According to this test, approximately equal quantities of crosslinking monomer, monofunctional monomer and functional material are combined in a test tube, and polymerized. If the resultant polymerized product is turbid or cloudy, a heterogeneous macroporous structure has formed which is a positive indication that the components tested can be combined in a ratio such that subsequent polymerization will result in the products of this invention. There are exceptions to this rule, in that certain combinations of materials may result in production of a clear polymer. If, however, the polymer is extracted from the reaction mixture and is determined to be cloudy or turbid, indicating a heterogeneous, macroporous structure, a positive test has again occurred. After a positive test, i.e., an initial turbid or cloudy appearance on polymerization of the test tube size sample, further tests are conducted by varying the ratio of monomers to functional material to determine those ranges in which discrete particles, and not clumps or masses, are obtained on polymerization. With the foregoing test in mind, and recognizing the need to obtain discrete particles and not clumped or massed polymers, it will be appreciated that those skilled in the art can select appropriate crosslinking monomers, monofunctional monomers and the ratio in which these materials are to be combined to obtain the entrapped materials of this invention.

The novel entrapped functional materials of this invention are versatile products having application in many and varied types of products. As stated previously, liquid and solid emollients and moisturizers form entrapped products suitable for incorporation in a wide variety of cosmetic, beauty and health care products.

Insecticides, disinfectants, sun screens, flavors, pigments and perfumes may also be used as functional materials in the entrapped system of this invention. Of course, the primary advantage of formation of the novel entrapped functional materials of this invention is the conversion of liquid or solid emollients and

moisturizers into powdery, free-flowing materials through incorporation in a syneresis free hydrophobic polymeric lattice having the ability to hold the functional materials for controlled application on demand. Other advantages of the entrapped functional materials of this invention include the ability to convert the solid and liquid functional materials into free-flowing discrete particles ranging in size from fine powders to rather large beads. Still another advantage of this invention lies in the fact that the polymer matrix itself provides desirable attributes on incorporation of the entrapped functional materials in cosmetics or toiletry preparations.

The entrapped functional materials of this invention are easy to handle, convenient to store, and are prepared by relatively non-complex procedures. Entrapment of the functional materials within the crosslinked polymer matrix or lattice protects the functional materials from many things, such as the environment, excessive volatilization, and from ultraviolet light. The functional materials are available from their entrapped state within the microscopic lattice by pressure, and diffusion due to temperature and humidity changes, or by extraction. Also, it has been found that the desirable characteristics of the entrapped functional materials, i.e., emollients and moisturizers, are enhanced by the polymer matrix itself. The polymer matrix or lattice provides a continuous film when applied to the skin, and the total effect of the compositions of this invention is to extend the emollient-moisturizer effect of the entrapped materials.

A decided advantage of the entrapped functional materials of this invention results from their capability of incorporating substantially high levels of functional material in a desired product than is possible through incorporation of the raw functional material. For example, it is known that an emollient such as 2 ethyl hexyl oxystearate (WICKENOL® 171) provides improved qualities of skin feel and moisturizing capability to toilet soap. However, it is not possible to incorporate more than about 2-5% of such an emollient in conventional toilet soap formulations without seriously detracting from the foaming characteristics of the soap. If the same functional material is formulated in the entrapped microscopic polymeric lattice of this invention, substantially higher concentrations of the functional material, up to as much as 20%, by weight, thereof, may be

incorporated in the toilet soap formulation where it serves to enhance the feel and moisturizing properties of the soap without any deleterious effect on the foaming and esthetic properties of the soap. The polymer portion of the complex also improves the mechanical
5 properties of the soap.

Another area of important application of the novel entrapped functional materials of this invention is in molded wax and/or oil base sticks of the type typically used for antiperspirants, deodorants, lipsticks, sunscreens, insect repellants and colognes.
10 Typically, such stick type products balance many ingredients to give a desired appearance and function, but the optimal solid wax-oil base stick seems to elude cosmetic formulators as problems of shrinkage, variable rate of deposition on the skin, tackiness, and the like, continue to plague such products. The entrapped functional materials
15 of this invention offer significant advantages for such stick type products as they make it possible to substantially reduce the bodying agents such as natural vegetable or insect waxes typically present in such stick products. This results from the fact that the polymeric lattice entrapping the functional material of this invention enhances
20 rigidity and strength of the stick while permitting the entrapped functional material to produce their desired effect as they are made available from their entrapped state.

The entrapped functional materials of this invention are free flowing powders which are easy to handle and convenient to store. The
25 functional materials are made available when applied to the skin either directly or as a component of a cosmetic or toiletry product through what is theorized to be a unique and novel mechanism. It is thought that the functional material acts in a manner analogous to that of a plasticizer when incorporated in the polymerized hydrophobic
30 matrix, and that when the entrapped functional material is applied to the body in a cosmetic or toiletry product it is made available as the result of rubbing and spreading in the form of a continuous uniform film protected within a hydrophobic envelope.

While it will be appreciated by those skilled in the art that
35 there are many variations in procedure and components, this invention may illustrated by the following examples:

EXAMPLE 1

7 grams of 2 ethylhexyl oxystearate (WICKENOL® 171) was mixed with 1.5 grams of ethylene glycol dimethacrylate and 1.5 grams of lauryl methacrylate in a glass test tube. The solution was deaerated for five (5) minutes and 0.1 ml of t-butyl peroctoate was added and
5 mixed while heating to 80°C. in an oil bath. After 20 minutes, the contents solidified; and the mixture was maintained at about 80°C. for an additional hour to assure full polymerization. A semi-soft, heterogeneous white opaque polymer mass resulted containing the entrapped ester.

10 The following examples demonstrate initial screening of crosslinking monomer, monofunctional monomer and functional material to determine whether or not the combination thereof will form the novel entrapped products of the invention. In each test the components are combined in a test tube and polymerization initiated
15 and completed. Formation of an opaque polymer mass in the test tube scale test indicates that the components can be combined in large scale polymerization to form the entrapped functional materials of this invention.

EXAMPLE 2

Following the procedure of Example 1, the crosslinking monomers
20 tetraethylene glycol dimethacrylate, trimethylolpropane trimethacrylate, trimethylol-propane ethoxy triacrylate, and allyl methacrylate were polymerized in the presence of 70%, by weight, of 2-ethylhexyl oxystearate and 15%, by weight, of lauryl methacrylate. In each case a semi-soft, white opaque polymer mass resulted,
25 indicating suitability for formation of the entrapped product of this invention.

EXAMPLE 3

Following the procedure of Example 1, test tube polymerization was completed varying the types of monomer constituents and their ratios, and the quantity and type of functional material to be entrapped. In each instance, t-butyl peroctoate was used to initiate 5 polymerization at a constant level of 3 weight percent, based on the weight of the combined content of monomers and functional material. The components, quantity and test tube results are set forth in Table

1. The following abbreviations are used in Table 1:

	TEGDM	Tetraethylene glycol dimethacrylate
10	TMPTM	Trimethyl propane trimethacrylate
	EGDM	Ethylene glycol dimethacrylate
	TPEIM	Trimethylol propane ethoxylate trimethacrylate
	LMA	Lauryl methacrylate
	IMA	Isodecyl methacrylate
15	HMA	Hydroxyethyl methacrylate
	DAA	Diacetone acrylamide
	PMA	Phenoxyethyl methacrylate
	MEMA	Methoxy ethyl methacrylate

TABLE I

Test No.	Cross-Linking Monomer	Weight %	Mono Functional Monomer	Weight %	Material Entrapped	Weight %	Appearance in Test Tube
1	TEGDM	67.5	LMA	22.5	2 Ethylhexyl stearate (WICKENOL® 171)	10	Hard-powdery, white opaque polymer mass
2	TMPTM	45	IMA	45	Arachidyl propionate (WAXENOL® 801)	10	Semi-hard, off-white opaque
3	TMPTM	12	IMA	3	Arachidyl propionate (WAXENOL® 801)	85	Semi-soft, off-white opaque
4	EGDM	18.7	SMA	6.3	Di(Ethylhexyl) adipate (WAXENOL® 158)	75	Semi-soft, white opaque
5	EGDM	30	HMA	10.3	Isopropyl Myristate (WICKENOL® 101)	60	Semi-soft, white opaque
6	EGDM	30	LMA	10	Ethanol	60	Hard-powdery, white opaque
7	TEGDM	67.5	SMA	22.5	Stearyl alcohol	10	Very hard, white opaque

Test no.	Cross-linking Monomer	Weight %	Mono Functional Monomer	Weight %	Material Entrapped	Weight %	Appearance in Test Tube
8	TEGDM	15	SMA	5	Stearyl alcohol	80	Hard-powdery white opaque
9	EGDM	67.5	DAA	22.5	Propylene glycol	10	Very hard, off-white opaque
10	EGDM	15	DAA	5	Propylene glycol	80	Semi-soft, off-white opaque
11	EGDM	60	LMA	30	Propionic acid	10	Very hard, white opaque
12	EGDM	15	LMA	5	Propionic acid	80	Semi-hard, white opaque
13	TEGDM	45	SMA	45	Stearic acid	10	Very hard, white opaque
14	TEGDM	10	SMA	10	Stearic acid	80	Semi-hard white opaque
15	EGDM	67.5	SMA	22.5	Polyoxypropylene (30 moles) cetyl alcohol (WICKENOL 707)	10	Very hard, white opaque
16	EGDM	15	SMA	5		80	Semi-soft, white opaque

Test No.	Cross-linking Monomer	Weight %	Mono Functional Monomer	Weight %	Material Entrapped	Weight %	Appearance in Test Tube
17	EGDM	60	DAA	30	Polyoxy propylene (30 moles lanolin)	10	Very hard, white opaque
18	EGDM	15	DAA	5	(WICKENOL® 727)	80	Semi-soft, yellowish, opaque
19	TEGDM	67.5	LMA	22.5	Carbowax® 300	10	Hard and clear
20	TEGDM	13	LMA	7		80	Semi-soft, white opaque
21	TPETM	54	PMA	36	Mineral oil	10	Hard-powdery, white opaque
22	TPETM	15	PMA	15	Mineral oil	70	Semi-soft, white opaque
23	TMPTM	45	MEMA	45	Petroleum jelly	10	Semi-soft, white opaque
24	TMPTM	15	MEMA	5	Petroleum jelly	80	Semi-soft, white opaque

Test No.	Cross-linking Monomer	Weight %	Mono Functional Monomer	Weight %	Material Entrapped	Weight %	Appearance in Test Tube
25	EGDM	45	LMA	45	Mineral spirits	10	Hard powdery, white opaque
26	EGDM	18.8	LMA	6.2	Mineral spirits	75	Semi-hard, white opaque
27	TEGDM	12.5	LMA	12.5	Lanolin	75	Semi-soft, yellow opaque
28	EGDM	60	SMA	30	Poly-hexa-methyl disiloxane	10	Very hard, white opaque
29	EGDM	15	SMA	5	(Dow® Q2-1096)	80	Hard, powdery, white opaque
30	EGDM	60	LMA	30	Poly dimethyl (cyclic) siloxane	10	Hard, powdery, white opaque
31	EGDM	22.5	LMA	7.5	(Dow® 344 & 345)	70	Hard, powdery, white opaque
32	EGDM	45	DAA	45	Poly Dimethyl(Lin ear) Siloxane (Dow® 200)	10	Very hard, white opaque
33	EGDM	10	DAA	10		80	Semi-hard, white opaque

The following examples demonstrate formation of the entrapped materials of this invention.

EXAMPLE 4

1.20 grams of polyvinyl pyrrolidone having a K value of about 80 to 100 and available from Dan River, Inc., was dissolved in 1500 ml of water in a 2000 ml three necked resin flask equipped with a stirrer, thermometer and nitrogen purge. A solution of 335 grams of 2 ethyl hexyl oxystearate (WICKENOL ® 171), 132 grams ethylene glycol dimethacrylate, 33 grams 2-ethylhexyl methacrylate and 5 ml t-butyl peroctoate was bubbled with nitrogen for 5 minutes. The resultant monomer mix was slowly added to the stirred aqueous solution of polyvinyl pyrrolidone at 22°C. under nitrogen. The temperature was raised to 80°C. with constant agitation and held until polymerization started in approximately 15 minutes, and maintained at 80°C. for an additional 2 hours to complete reaction. Semi-soft, white opaque beads were collected by filtering off the supernatant liquid and dried to remove any excess water. The beads weighed 450 g. for a yield of 90%, and were 0.25 to 0.5 mm. in diameter. Other protective colloids such as starch, polyvinyl alcohol, carboxymethyl cellulose, methyl cellulose, or inorganic systems such as alkali metal hydroxides may be used in place of the polyvinyl pyrrolidone suspending medium.

EXAMPLE 5.

The procedure of Example 4 was repeated except that in each case 337.5 g. arachidyl propionate (WAXENOL® 801), or 337.5 g. mineral oil, or 350 g. cyclic polydimethyl siloxane (Dow® 345), or 350 g. petroleum distillate (150 to 160°C. boiling point), or 325 g. petroleum jelly, or 350 g. isopropyl isostearate (WICKENOL® 131), or 375 g. di(2 ethylhexyl)adipate (WICKENOL® 158), were substituted for 2-ethylhexyl oxystearate. In each case, semi-soft, white opaque beads were collected in good yield. These beads may be incorporated in cosmetic or toiletry products where they demonstrate their desired effect by making the entrapped emollient-moisturizer available for application to the skin. The particle size of the resultant bead in each case was between 0.25 to 0.5 mm in diameter, the precise particle size varying somewhat in the degree and rate of agitation during polymerization and the rates of the components to the water in which the polymerization system was suspended.

The following examples demonstrate cosmetic or toiletry compositions in which the entrapped functional materials of this invention have been incorporated.

EXAMPLE 6

Translucent Pressed Powder

	Talc	77.64
	Kaolin	14.00
	75% Arachidyl propionate	
5	entrapped bead of Example 5	5.00
	Magnesium carbonate	2.00
	Colorants	0.31
	Methyl paraben	0.10
	Propyl paraben	0.10
10	Germall® 115	0.10
	Fragrance	0.75
		<hr/> 100.00

The components were combined in accordance with conventional formulation techniques. The entrapped emollients (Example 5 product) 15 provided the pressed powder with desired emollient properties and application of the product to the body makes the emollient available by rubbing. The pressed powder was remarkably resistant to breakage, crumbling and glazing.

EXAMPLE 7

Milled Toilet Soap

	Toilet soap base of tallow and coconut ¹	89.00
5	2-ethylhexyl oxystearate entrapped bead of Example 4	10.00
	Fragrance	<u>1.00</u>
		100.00

¹ Duveen Soap Corporation, 154 Morgan Avenue, Brooklyn, New York.

The components were combined in accordance with conventional
10 formulation techniques. The entrapped emollient (Example 4) provided
the soap with desired emollient properties. In addition, the physical
attributes of the soap were enhanced, rendering it more resistant to
cracking in use and less brittle. The soap had excellent lathering
properties.

EXAMPLE 8

Body Powder

	Talc	84.5
	Fragrance	0.5
5	2-ethylhexyl oxystearate entrapped bead of Example 4	10.00
	Syloid #74	<u>5.00</u>
		100.00

The components were combined in accordance with conventional formulation techniques. The entrapped emollient (Example 4) provided 10 the body powder with desired emollient properties. In addition, the physical properties of the body powder were enhanced, providing increased adhesion to the body.

EXAMPLE 9

Antiperspirant StickPhase A

	Stearyl alcohol	25.0
	Synthetic Beeswax Flakes ^a	
5	WAXENOL® 821	10.0
	Myristyl Myristate ^a	
	WAXENOL® 810	25.0
	Propylene glycol stearate	5.0

Phase B

10	Aluminum chlorhydrate ^a	
	WICKENOL® CPS 325	25.0

Phase C

	2 Ethylhexyl oxystearate	
	entrapped bead of Example 4	5.0
15	Di-octyl adipate entrapped	
	bead of Example 5	<u>5.00</u>
		100.00

^a Wickhen Products, Inc., Huguenot, New York 12746.

The antiperspirant stick formulations are prepared by heating the components of Phase A to 65-70°C. until melted, adding the component of Phase B without further heating and with constant and continuous agitation followed by slow addition of the components of Phase C with constant agitation until a uniform mixture is obtained. The mixture is then cooled somewhat and poured into molds at temperatures of from about 50 to 55°C. The antiperspirant stick has enhanced rigidity and strength and desired emollient properties without tackiness.

CLAIMS

1. A solid, entrapped emollient-moisturizer composition comprising from about 5 to about 95 weight percent of a crosslinked polymer matrix and from about 95 to about 5 weight percent of an emollient-moisturizer selected from the group consisting of a
5 straight, branched or cyclic hydroxyl alcohol containing 1 to 30 carbon atoms, a straight, branched or cyclic carboxylic acid containing 1 to 30 carbon atoms, an ester containing a C_1 to C_{30} carboxylic acid esterified with a C_1 to C_{30} hydroxyl alcohol, a hydroxyl alcohol ether containing 1 to 30 carbon atoms, a carboxylic
10 acid ether containing 1 to 30 carbon atoms, an alkane of the formula $H-(CH_2)_n-H$ wherein n is 5 to 30, lanolin and its derivatives, and a siloxane.
2. The solid, entrapped emollient-moisturizer composition of Claim 1 wherein said crosslinked polymer matrix comprises a di or
15 polyfunctional crosslinking monomer and a monofunctional monomer selected from the group consisting of hydrophobic and hydrophylic mono unsaturated monomers.
3. The solid, entrapped emollient-moisturizer composition of Claim 2 wherein said functional crosslinking monomer is a
20 polyunsaturated monomer selected from the group consisting of a mono or di or polyester of mono, di or polyvalent alcohol and α - β unsaturated carboxylic acid, polyunsaturated polyvinyl ether of a polyvalent alcohol, mono or polyunsaturated amides and cycloaliphatic esters of α - β unsaturated carboxylic acids.
- 25 4. The solid, entrapped emollient-moisturizer composition of Claim 1 wherein said emollient-moisturizer contains from about 10 to about 90 weight percent fragrance.
5. The solid, entrapped emollient-moisturizer composition of Claim 1 wherein said emollient moisturizer contains from about 0.1 to
30 about 10 weight percent of an oil soluble dye.
6. The solid, entrapped emollient-moisturizer composition of Claim 1 wherein said emollient-moisturizer contains from about 0.1 to about 10 weight percent of a lake.
7. The solid, entrapped emollient-moisturizer composition of
35 Claim 1 wherein said emollient-moisturizer contains from about 0.1 to about 10 weight percent of a pigment.

8. The solid, entrapped emollient-moisturizer composition of claim 1 wherein said emollient-moisturizer is 2-ethylhexyl hydroxystearate.

5 9. The solid, entrapped emollient-moisturizer composition of claim 1 wherein said emollient-moisturizer is a mineral oil.

10 10. The solid, entrapped emollient-moisturizer composition of claim 1 wherein said emollient-moisturizer is arachidyl propionate.

11. The solid, entrapped emollient-moisturizer composition of claim 1 wherein said emollient-moisturizer is petroleum jelly.

15 12. The solid, entrapped emollient-moisturizer composition of claim 1 wherein said emollient-moisturizer is a siloxane.

13. The use of the composition according to claims 1 - 12 for cosmetic and toiletry composition.